

WHAT IS CLAIMED IS:

1. A color separating/synthesizing apparatus comprising:

5 a light component separating unit for reflecting a selected one of light components, included in an incident light emitted from a light source, in a direction perpendicular to a travel path of the incident light while allowing the remaining light components to be transmitted therethrough along the travel path of the incident light;

10 a first synthesizing unit for receiving the light components transmitted through the light component separating unit, and separating the received light components from each other, the first synthesizing unit also serving to form images respectively corresponding to the separated light components via a first LCD and a second LCD, to synthesize the images, and to allow the synthesized image to be directed in a direction perpendicular to the incident light introduced into the dichroic filter;

15 a second synthesizing unit for receiving the light component reflected from the light component separating unit, forming an image corresponding to the received light component via a third LCD, and reflecting the image in a direction parallel to the travel path of the incident light introduced into the dichroic filter; and

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a third synthesizing unit for synthesizing light beams respectively containing the images formed in the first and second synthesizing units, and allowing the synthesized light to be directed in the direction perpendicular to the incident light introduced into the dichroic filter.

2. The color separating/synthesizing apparatus according to claim 1, wherein the light component separating unit comprises:

a first color selecting retarder for allowing the incident light emitted from the light source to be transmitted therethrough while converting the selected light beam into an S-polarized state; and

a first polarized beam splitter for reflecting the S-polarized light component of the light transmitted through the first color selecting retarder while allowing the remaining components of the transmitted light to be transmitted therethrough.

3. The color separating/synthesizing apparatus according to claim 1, wherein the first synthesizing unit comprises:

a second color selecting retarder for converting a selected one of light components, included in the light transmitted through the light component separating unit, into

S waves;

a second polarized beam splitter for reflecting an S-polarized component of the light transmitted through the second color selecting retarder while allowing the remaining component of the transmitted light to be transmitted therethrough;

the first LCD for reflecting the S-polarized light reflected by the second polarized beam splitter while forming an image corresponding to the S-polarized light incident thereto and converting the polarized state of the S-polarized light into P waves, the first LCD also serving to allow the reflected P-polarized light to be directed to the second polarized beam splitter;

the second LCD for reflecting the P-polarized light transmitted through the second polarized beam splitter while forming an image corresponding to the P-polarized light incident thereto and converting the polarized state of the P-polarized light into S waves, the second LCD also serving to allow the reflected S-polarized light to be directed to the second polarized beam splitter, thereby allowing the S-polarized light to be synthesized, in the second polarized beam splitter, with the P-polarized light directed to the second polarized beam splitter; and

a third color selecting retarder for allowing a light, resulting from the synthesis of the S and P-polarized light

beams directed to the second polarized beam splitter, to be transmitted therethrough when the light travels in the direction perpendicular to the incident light introduced into the dichroic filter, while converting an S-polarized component of the light into P waves.

4. The color separating/synthesizing apparatus according to claim 1, wherein the second synthesizing unit comprises:

a third polarized beam splitter for reflecting the light beam reflected by the light component separating unit;

a third LCD for reflecting the light transmitted through the third polarized beam splitter while forming an image corresponding to the light incident thereto and converting the polarized state of the P-polarized light into P waves, the third LCD also serving to allow the reflected P-polarized light to be directed to the third polarized beam splitter so that the light directed to the third polarized beam splitter is directed in parallel to the travel path of the incident light introduced into the light component separating unit; and

a third color selecting retarder for converting the polarized state of the light transmitted through the third polarized beam splitter into S waves.

5. The color separating/synthesizing apparatus according to claim 1, wherein the third synthesizing unit comprises a fourth polarized beam splitter for allowing the light emerging from the first synthesizing unit to be transmitted therethrough while reflecting the light emerging from the second synthesizing unit, thereby allowing all the light beams to be directed in the direction perpendicular to the travel direction of the incident light introduced into the light component separating unit.

6. The color separating/synthesizing apparatus according to claim 1, further comprising:

a polarization plate arranged on a travel path of the light emerging from the light component separating unit and adapted to allow an S-polarized component of the light to be transmitted therethrough.

7. The color separating/synthesizing apparatus according to claim 1, further comprising:

a fifth color selecting retarder adapted to allow the light components synthesized by the third synthesizing unit to have the same polarized state.